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EXAMINER				
PRENDERGAST, ROBERTA D				
ART UNIT		PAPER NUMBER		
2628				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/533,675

**Applicant(s)**

CHIBA, TATSURO

**Examiner**

ROBERTA PRENDERGAST

**Art Unit**

2628

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 July 2008.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3,5-9 and 13-16 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-3,5-9 and 13-16 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO/S5108)  
Paper No(s)/Mail Date 7/28/2008  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Drawings*

Examiner acknowledges the amendment to the specification, filed 7/28/2008, which overcomes the objection to the drawings, and therefore the objection to the drawings is hereby withdrawn.

### ***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Examiner acknowledges the amendment to claims 1-7 and 9 and the cancellation of claim 12, filed 7/28/2008, that overcomes the rejection under 35 USC § 101 and therefore the rejection of claims 1-7, 9 and 12 under 35 USC § 101 is hereby withdrawn.

**Claim 8 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.**

Claim(s) 8 is rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. While the claims recite a series of steps or acts to be performed, a statutory "process" under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing. The instant claims neither transform underlying subject matter nor positively tie to another statutory

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category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process.

### ***Double Patenting***

Applicant is advised that should claim 1 be found allowable, claim 7 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Examiner acknowledges the amendment of claim 5, filed 7/28/2008, that overcomes the rejection under the second paragraph of 35 USC § 112 and therefore the rejection of claim 5 under the second paragraph of 35 USC § 112 is hereby withdrawn.

Examiner acknowledges the amendment canceling claims 10-12, filed 7/28/2008, that overcomes the rejection under the second paragraph of 35 USC § 112 and therefore the rejection of claims 10-12 under the second paragraph of 35 USC § 112 is hereby withdrawn.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1-3, 7-9 and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishii U.S. Patent No. 6272448 in view of R Yokoyama, M Shirasawa, Y Kikuchi, "TOPOGRAPHICAL FEATURE REPRESENTATION BY OPENNESS MAPS", International Symposium on Remote Sensing, 2000 - register.itfind.or.kr, Google Scholar, Pages 1-8, hereinafter Yokoyama et al.**

**Referring to claim 1**, Ishii teaches a visualization processing system comprising:

a computer (Fig. 1; column 4, lines 15-19, i.e. an apparatus having a memory device, a processor, an input device, an output device, and a control device that are connected by bus lines is understood to be a computer);

a set of data structures employed as computer components of the computer, the set of data structures defining a vector field, a three-dimensional coordinate space, and a two-dimensional plane (column 3, lines 13-25; column 4, lines 20-22 and 33-34; column 5, lines 29-33; column 6, lines 25-32; column 9, lines 12-25, i.e. a memory device provided with regions for storing the contour data and the DTM generated by the apparatus wherein a gradient vector is determined from the elevational values of a point (x,y) and its eight-points neighborhood such that a gradient vector field is determined

and setting an imaginary projection plane for the process of three-dimensional projection is understood to indicate the data structures as claimed); and

a set of computer programs employed as computer components of the computer (column 4, lines 23-32 and 35-36, i.e. a memory device having regions for storing a program to produce the initial DTM, a program to operate the smoothing operator, a program to set boundary conditions, and a control program OS such that the control device controls the respective devices for executing the program indicates a set of programs as claimed), the set of computer programs comprising:

a first subset thereof for mapping the vector field in the three-dimensional coordinate space to obtain a corresponding sequence of coordinate points (column 5, lines 29-47; column 6, lines 27-32, i.e. a gradient vector field is determined and then discrete integral line calculation is performed obtain the flowing water line consisting of consecutive lattice points that passes the point  $(x,y)$  thus indicating mapping the vector field in the three-dimensional coordinate space (defined by elevational values for points  $(x,y)$ ));

a second subset thereof for determining an elevation degree connecting the sequence of coordinate points; and a third subset thereof for determining a depression degree connecting the sequence of coordinate points (column 6, lines 53-65; column 7, lines 11-17, i.e. it is determined whether a point is in a ridge-valley area and if a point belongs to a ridge-valley area, a smoothing operator is performed using a weight  $wd(x,y)$  that depends on the degree of ridge (elevation degree) or valley (depression

degree) on a point thus indicating the determination of an elevation or depression degree as claimed);

a fourth subset thereof for synthesizing the elevation degree and the depression degree in a weighting manner to determine an elevation-depression degree at said region of the plane connecting the sequence of coordinate points (column 6, lines 53-65; column 7, lines 3-17, i.e. it is determined whether a point is in a ridge-valley area and if a point belongs to a ridge-valley area, a smoothing operator is performed using a weight  $wd(x,y)$  that depends on the degree of ridge (elevation degree) or valley (depression degree) on a point thus indicating the synthesizing of the elevation degree and the depression degree in a weighting manner as claimed);

a fifth subset thereof for mapping the three-dimensional coordinate space on the two-dimensional plane, providing a tone indication commensurate with the elevation-depression degree of said region to a region on the two-dimensional plane corresponding to the local said region of the plane connecting the sequence of coordinate points (column 9, lines 16-30, i.e. setting an imaginary projection plane for the process of three-dimensional projection such that each point of the DTM (PD) produced by the apparatus is projected to the projection plane and, at the same time, a tone of each point of the DTM on the projection plane (PH) is determined is understood to indicate the data structures as claimed); and

a sixth subset thereof for determining an inclination distribution of the plane connecting the sequence of coordinate points, the fifth subset providing on the two-dimensional plane said tone indication for a brightness of a color-toned indication of the

inclination distribution (column 9, lines 21-36, i.e. determining a tone of each point of the DTM on the projection plane (PH) based on the elevational value of the point and/or the gradient of the surface at the point and/or the irradiance at the point indicates that the tone is the sixth subset indicating the inclination distribution and the gradient of the surface is the fifth subset indicating brightness of a color-toned indication of the inclination).

Ishii does not specifically teach determining an elevation degree as an aboveground opening at a region of the plane connecting the sequence of coordinate points; and a third subset thereof for determining a depression degree as an aboveground opening at said region of the plane connecting the sequence of coordinate points.

Yokoyama et al. teaches these limitations (page 1, Abstract; pages 2-4, section 2 Overground angle and underground angle; pages 4-5, section 3 Overground openness and underground openness, i.e. each grid point is described by a triplet of  $(i, j, H)$  where  $i$  and  $j$  are column and row numbers on the DEM and  $H$  is the elevation, assuming two points of  $A(i, j, H)$  and  $B(i', j', H)$ , the distance  $P$  between  $A$  and  $B$  is given by  $P = M[(i_a - i_b)^2 + (j_a - j_b)^2]^{1/2}$ , the overground elevation angle is  ${}_o\Phi_L = 90 - {}_o\beta_L$  and the underground depression angle is  ${}_u\psi_L = 90 + {}_u\delta_L$  such that the overground openness at a point of object within a distance of  $L$  on DEM is defined as  $\Phi_L = 90 - (0\phi_L + 45\phi_L + 90\phi + 135\phi_L + 180\phi_L + 225\phi_L + 270\phi_L + 315\phi_L)/8$  and the underground openness at a point of object within a distance of  $L$  on DEM is defined as  $\psi_L = 90 - (0\psi_L + 45\psi_L + 90\psi_L + 135\psi_L + 180\psi_L + 225\psi_L + 270\psi_L + 315\psi_L)/8$  thus indicating that the elevation degree

is determined as an aboveground opening and the depression degree is determined as an underground opening as claimed).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system and method of Ishii with the teachings of Yokoyama et al. wherein the elevation degree is determined as an aboveground opening at a region and the depression degree is determined as an aboveground opening at a region thereby providing a system wherein overground openness represents convex features of topography and the underground openness represents concave features of topography such that the opennesses are free from the light source position and robust to noise in the DEM such that specifying the distance L adapted to topographical scale of the object area allows various features of topography to be extracted (Yokoyama et al: pages 6-7, section 5. Conclusion).

**Referring to claim 2**, the rationale for claim 1 is incorporated herein, Ishii, as modified above, teaches the visualization processing system as claimed in claim 1 but does not specifically teach wherein the elevation degree is defined in terms of a see-through solid angle at an obverse side within a range of the plane connecting the sequence of coordinate points.

Yokoyama et al. teaches this limitation (pages 3-4, figures 2-3; pages 3-4, section 2 Overground angle and underground angle, final paragraph; pages 4-5, section 3 Overground openness and underground openness, 2<sup>nd</sup> paragraph, i.e. the overground angle is the maximum Zenithal angle by which a sky along an azimuth D is visible within a range of distance L from a focused sample point thus indicating a see-through solid

angle at an obverse side within a range as claimed and defined in paragraph [0083] of the specification).

The rationale for combining Ishii with the teachings of Yokoyama et al. as found in the motivation statement of claim 1 above is incorporated herein.

**Referring to claim 3**, the rationale for claim 2 is incorporated herein, Ishii, as modified above, teaches the visualization processing system as claimed in claim 2 but does not specifically teach wherein the depression degree is defined in terms of a see-through solid angle at a reverse side within said range of the plane connecting the sequence of coordinate points.

Yokoyama et al. teaches this limitation (pages 3-4, figures 2-3; pages 3-4, section 2 Overground angle and underground angle, final paragraph; pages 4-5, section 3 Overground openness and underground openness, 2<sup>nd</sup> paragraph, i.e. the underground angle is the maximum nadir angle within a range of distance L, when looking under the ground, standing on the head from a focused sample point thus indicating a see-through solid angle at a reverse side within a range as claimed and defined in paragraph [0084] of the specification).

The rationale for combining Ishii with the teachings of Yokoyama et al. as found in the motivation statement of claim 1 above is incorporated herein.

**Referring to claim 7**, claim 7 recites all of the elements of claim 1 and therefore the rationale for the rejection of claim 1 is incorporated herein.

**Referring to claim 8**, claim 8 recites all of the elements of claim 1 and therefore the rationale for the rejection of claim 1 is incorporated herein.

**Referring to claim 9**, the rationale for claim 1 is incorporated herein, Ishii, as modified above, teaches all of the elements of claim 9 that are similar in scope to claim 1 and further teaches a computer readable medium encoded with the set of data structures and the set of programs as claimed in claim 1 (Fig. 1(element 2); column 4, lines 20-36, i.e. a memory device comprising regions for storing the data structures and programs claimed in claim 1 is understood to be a computer readable medium as claimed in claim 9, Examiner is interpreting the computer readable medium as being the computer memory taught in the specification as originally filed, see page 10, lines 8-14).

**Referring to claim 13**, claim 13 recites all of the elements of claims 1-3 and therefore the rationale for the rejection of claims 1-3 is incorporated herein.

**Referring to claim 14**, claim 14 recites all of the elements of claims 1 and 13 and therefore the rationale for the rejection of claims 1 and 13 is incorporated herein.

**Claims 5 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishii in view of Yokoyama et al., as applied to claims 1 and 13 above, and further in view of Piper, B., Ratti, C., and Ishii, "Illuminating clay: a 3-D tangible interface for landscape analysis", *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems: Changing Our World, Changing Ourselves*, April 20-25, 2002, CHI '02, ACM, NY, NY, pages 355-362, hereinafter Piper et al.**

**Referring to claim 5**, the rationale for claim 1 is incorporated herein, Ishii, as modified above teaches the system as claimed in claim 1 but does not teach wherein the sixth subset provides the color-toned indication of the inclination distribution in red colors.

Piper et al. teaches this limitation (page 358, Slope Variation & Curvature, i.e. the DEM is processed using two Sobel filters to determine the x and y derivatives of the topographic surface such that the absolute value of the resulting gradient function returns the slope at a given point in the topography, the slope/inclination value is then displayed using a color map ranging from red to purple, where the two extremes correspond to the maximum and minimum slope/inclination values thus indicating that the color-toned inclination distribution is indicated in red colors).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system Ishii with the teachings of Yokoyama et al. and Piper et al. wherein the slope is indicated on the terrain model using a color map ranging from red to purple based on the absolute value of the gradient function thereby providing a thorough understanding of the slope and curvature of the landscape topography, which is extremely important in almost all landscape analysis (Piper et al.: page 358, Slope Variation & Curvature, lines 1-4).

**Referring to claim 15**, claim 15 recites all of the elements of claims 5 and 13 and therefore the rationale for the rejection of claims 5 and 13 is incorporated herein.

**Claims 6 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishii in view of Yokoyama et al., as applied to claims 1 and 13 above, and further in view of Kikukawa ET AL., "Solid Texturing o Riyo Shita 3-Jigen Nin'I Gamenjo ni Okeru Sensekibun Tatamikomihō", The Journal of the Institute of Image Electronics Engineers of Japan, 25 July 2000 (25.07.00), Vol. 29, No. 4, translation and original document, pages 1-3 and 283-291.**

Referring to claim 6, the rationale for claim 1 is incorporated herein, Ishii, as modified above teaches the system as claimed in claim 1 but does not teach wherein the elevation degree (B) (claim 2) is defined in terms of a solid angle at one side in the local region of the plane connecting the sequence of coordinate points; the depression degree (C) (claim 3) is defined in terms of a solid angle at the other side in the local region of the plane connecting the sequence of coordinate points; a seventh operator (67) for connecting, among the sequence of coordinate points, those coordinate points equivalent of an attribute in the vector field (70) to obtain an attribute isopleth line (I), and an eighth operator (68) for mapping the attribute isopleth line (I) on the two-dimensional plane (90) given the tone indication (F).

Kikukawa et al. teaches a seventh subset thereof for connecting, among the sequence of coordinate points, those coordinate points equivalent of an attribute in the vector field to obtain an attribute isopleth line; and an eighth subset thereof for mapping the attribute isopleth line on the two-dimensional plane given said tone indication (translation, pages 1-3, i.e. a 3d lattice has coordinates points covering the physical body such that streamline points are approximated as a broken line that connects a

tangent extended along the vector to each cell of the lattice thus generating connecting coordinate points and generating isopleth lines, the direction toward the surface/component plane is mapped as hue, and the magnitude is mapped as saturation thus indicating that the flow lines are mapped on the 2d plane by tone).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system Ishii with the teachings of Yokoyama et al. and Kikukawa et al. wherein streamline points are approximated as a broken line that connects a tangent extended along the vector to each cell of the 3D lattice thus connecting coordinate points and generating isopleths lines thereby providing a very powerful Line Integral Convolution (LIC) vector field visualization technique that can effectively reveal the global and complex structures of a flow field that can extend LIC for visualizing the vector field on any arbitrary 3d surfaces, such as a contour surface or a surface of a 3d object represented implicitly as a part of a curvilinear or unstructured grid (Kikukawa et al. page 283, summary).

**Referring to claim 16**, claim 16 recites all of the elements of claims 6 and 13 and therefore the rationale for the rejection of claims 6 and 13 is incorporated herein.

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-3 and 5-9 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROBERTA PRENDERGAST whose telephone number is (571)272-7647. The examiner can normally be reached on M-F 6:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka Chauhan can be reached on (571) 272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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